

REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application are made obvious under the provisions of 35 U.S.C. §103. The Applicants herein amend claim 1. Support for the amendment may be found in the Applicants' specification on at least paragraph [0018]. Thus, the Applicants believe that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 1-13 AND 15-21 UNDER 35 U.S.C. § 103

A. Claims 1, 4, 8, 9, 11, 13, 15-18 and 21

The Examiner has rejected claims 1, 4, 8, 9, 11, 13, 15-18 and 21 in the Office Action as being unpatentable under 35 U.S.C. § 103 over Suzuki (U.S. Patent No. 5,787,122, issued July 28, 1998, hereinafter referred to as "Suzuki") in view of (EP 0740430, hereinafter referred to as "Ohashi"). Applicants respectfully traverse the rejection.

Suzuki teaches a method and apparatus for transmitting and receiving encoded data as burst signals using a number of antennas. Specifically, Suzuki teaches a reception system that sends a reception signal encoded and dispersed into a plurality of symbols. (See Suzuki, col. 9, ll. 2-6). The reception signal is then received by a plurality of antennas. (See Suzuki, col. 9, ll. 7-12). Each time the antenna switcher receives burst data, the antenna switcher switches the antenna under control of the communication control unit. The antennas may be selected in the previously determined sequential order or may be randomly selected based on data generated at random. (See Suzuki, col. 9, ll. 13-26). Then the reception signal obtained is demodulated, deinterleaved and reconverted into the original data. (See Suzuki, col. 9, ll. 27-33).

Ohashi teaches a diversity radio communication system where an antenna switch circuit switches the first and second antennas to connect them to the transmit/receive switch circuit. (See Ohashi, p. 6, ll. 1-8).

The Examiner's attention is directed to the fact that Suzuki and Ohashi, alone or in any combination, fails to teach or to suggest the novel concept of switching between said first and second antennas in response to a predefined schedule of a sequence of

scheduled packet bursts, wherein said sequence of scheduled packet bursts comprises at least a first signal burst received via said first antenna and a second signal burst received via said second antenna, wherein the first signal burst and the second signal burst comprise identical packets of a common message or transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message, as positively claimed by the Applicants.

Specifically, Applicants' amended independent claims 1, 8, and 13 positively recite:

1. A radio receiver comprising:
first and second antennas connected to radio frequency (RF) processing circuitry by an RF switch; and
an RF switch control in communication with said RF switch, said RF switch control for switching between said first and second antennas in response to a predefined schedule of a sequence of scheduled packet bursts, wherein said sequence of scheduled packet bursts comprises at least a first signal burst received via said first antenna and a second signal burst received via said second antenna, wherein the first signal burst and the second signal burst comprise identical packets of a common message. (Emphasis added).
8. A method of achieving a Quality of Service (QoS) control in a wireless local area network (LAN) communication system, comprising steps of:
transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message; and
receiving each of the packet bursts individually at one of a plurality of antennas in accordance with a predefined schedule, where said predefined schedule is used to select one of said plurality of antennas for receiving each of said packet bursts. (Emphasis added).
13. A communication system for coupling a transmitter and a receiver adapted for receiving at least first and second signal bursts by first and second antennas respectively, and responding to the two signal bursts to communicate a single unified message at the receiver; whereby:
the first and second signal bursts are sequentially separated in time in accordance with a predefined schedule, wherein the first signal burst and the second signal burst comprise identical packets of a common message;
the first and second antennas are sequentially enabled in accordance with said predefined schedule to communicate with at least one storage medium at the receiver; and
enabling a representation of the unified message by responding to the first

and second signal bursts. (Emphasis added).

In one embodiment, Applicants' invention provides a method and system for the reception of digital radio signals using a protocol assisted switched diversity antenna system. One aspect of the invention is that the antennas are switched in response to packet bursts or signal bursts that are scheduled or ordered by time intervals. Namely, the antennas are switched in accordance with a predefined schedule. Thus, the packet bursts are first scheduled and then sent to the receiver in accordance with that predefined schedule. Similarly, the switching of the antennas is also performed in accordance with the predefined schedule.

Furthermore, the independent claims recite the limitation where a series of two signal bursts carrying exactly the same information is sent in accordance with the predefined schedule. In other words, both signal bursts carrying the same information are pre-scheduled to be sent with the same information. (See e.g., Applicants' specification, para. [0020]-[0021]).

The Applicants respectfully submit that the alleged combination (as taught by Suzuki) fails to render obvious the Applicants' invention because the combination fails to teach or suggest the novel concept of switching between said first and second antennas in response to a predefined schedule of a sequence of scheduled packet bursts, wherein said sequence of scheduled packet bursts comprises at least a first signal burst received via said first antenna and a second signal burst received via said second antenna, wherein the first signal burst and the second signal burst comprise identical packets of a common message or transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message. In contrast, Suzuki fails to provide this teaching. At best, Suzuki may request for a resubmission of a signal burst if an error is detected. In other words, if the signal burst was not properly received, then the receiver may request for a retransmission of the signal burst. Therefore, the resubmission of the second signal burst in response to a detected error as taught by the prior art is clearly not pre-scheduled to be sent with the same information, as positively recited by Applicants'

independent claims. In other words, Suzuki cannot pre-schedule as to when an error will occur.

Moreover, Ohashi fails to bridge the substantial gap left by Suzuki because Ohashi also fails to teach or suggest switching between said first and second antennas in response to a predefined schedule of a sequence of scheduled packet bursts, wherein said sequence of scheduled packet bursts comprises at least a first signal burst received via said first antenna and a second signal burst received via said second antenna, wherein the first signal burst and the second signal burst comprise identical packets of a common message or transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message. Notably, Ohashi suffers from the same deficiency as suffered by Suzuki. That is, Ohashi only teaches that the same message is re-transmitted in response to an error. (See Ohashi, p. 10, l. 57 – p. 11, l. 2). Therefore, the re-submission by Ohashi is not a predefined schedule. Ohashi cannot pre-schedule as to when an error will occur.

Moreover, Ohashi teaches that the same transmitter and receiver receive the same data. In stark contrast, the Applicants' invention teaches that the predefined schedule of scheduled packet bursts are received by different antennas (i.e. via first antenna and via a second antenna). Therefore, Applicants respectfully submit that independent claims 1, 8 and 13 are clearly patentable and not rendered obvious by the combination of Suzuki and Ohashi.

Furthermore, dependent claims 4, 9, 11, 15-18 and 21 depend from claims 1, 8 and 13, respectively, and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 4, 9, 11, 15-18 and 21 are also patentable and not rendered obvious by Suzuki and Ohashi.

B. Claims 2, 3 and 12

The Examiner has rejected claims 2, 3 and 12 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Suzuki and Ohashi in view of Aaronson, et al. (U.S. Patent No. 6,363,062, issued March 26, 2002, hereinafter referred to as

"Aaronson"). Applicants respectfully traverse the rejection.

The teachings of Suzuki and Ohashi are discussed above. Aaronson teaches a communications protocol for packet data. A MAC layer schedules communication bursts taking into account factors such as propagation delay between the different nodes, queuing of data and synchronization of the time transmitting from multiple nodes. (See Aaronson, col. 3, ll. 22-30).

However, Aaronson fails to bridge the substantial gap left by Suzuki and Ohashi. Specifically, Aaronson also fails to disclose the novel concept of switching between said first and second antennas in response to a predefined schedule of a sequence of scheduled packet bursts, wherein said sequence of scheduled packet bursts comprises at least a first signal burst received via said first antenna and a second signal burst received via said second antenna, wherein the first signal burst and the second signal burst comprise identical packets of a common message or transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message.

As stated above, the combination of Suzuki and Ohashi simply does not teach or suggest the novel concept of switching between said first and second antennas in response to a predefined schedule of a sequence of scheduled packet bursts, wherein said sequence of scheduled packet bursts comprises at least a first signal burst received via said first antenna and a second signal burst received via said second antenna, wherein the first signal burst and the second signal burst comprise identical packets of a common message or transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message. This deficiency is not bridged by the teaching of Aaronson because Aaronson only teaches using MAC protocol to schedule packet data. (See Aaronson, col. 3, ll. 22-30).

Dependent claims 2, 3 and 12 depend from claims 1 and 8, respectively, and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 2, 3 and 12 are also not made obvious by the

teachings of Suzuki, Ohashi and Aaronson.

C. Claims 5 and 6

The Examiner has rejected claims 5 and 6 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Ohashi in view of Khayrallah (XP-000889044, hereinafter referred to as "Khayrallah"). Applicants respectfully traverse the rejection.

Ohashi teaches a diversity radio communication system where an antenna switch circuit switches the first and second antennas to connect them to the transmit/receive switch circuit. (See Ohashi, p. 6, II.1-8).

Khayrallah teaches an improved time-diversity method. The number of antennas is grouped based on the depth of the interleaver. Then the antennas are selected according to conventional selection diversity methods such as, to maximize signal strength or signal-to-noise ratio. (See Khayrallah, para. 2, II.10-11). In another embodiment, the antennas can be cycled in a pre-determined pattern or at random. (See Khayrallah, para. 3, II. 4-5).

However, Ohashi and Khayrallah (either singly or in any permissible combination) fail to teach, show or suggest the Applicants' invention. Specifically, Ohashi and Khayrallah fail to disclose the novel concept of enabling a first antenna to receive a first packet burst in accordance with said predefined schedule and enabling a second antenna to receive a second packet burst in accordance with the predefined schedule, wherein the first packet burst and the second packet burst comprise identical packets of a common message. Applicants' amended independent claim 5 positively recites:

5. A method of maintaining a controlled Quality of Service (QoS) in a wireless communication system, comprising steps of:

receiving scheduled communications from a transceiver at a transmission station in accordance with a predefined schedule by wireless transceivers at receiving stations having switched protocol diversity reception operational modes, where said scheduled communications being formatted as multiple packet bursts;

enabling a first antenna to receive a first packet burst in accordance with said predefined schedule;

enabling a second antenna to receive a second packet burst in

accordance with said predefined schedule, wherein the first packet burst and the second packet burst comprise identical packets of a common message;

recording the received bursts as soft information in a storage medium; and combining the soft information from the first and second bursts into a single message. (Emphasis added).

In arguendo, even if Ohashi and Khayrallah were combined, the combination would still not teach or suggest Applicants' invention. Specifically, the combination of Ohashi and Khayrallah would also fail to teach enabling a first antenna to receive a first packet burst in accordance with said predefined schedule and enabling a second antenna to receive a second packet burst in accordance with the predefined schedule, wherein the first packet burst and the second packet burst comprise identical packets of a common message. As discussed above, Ohashi only teaches that the same message is re-transmitted in response to an error. (See Ohashi, p. 10, l. 57 – p. 11, l. 2). Therefore, the re-submission by Ohashi is not performed in accordance with a predefined schedule. Ohashi cannot pre-schedule as to when an error will occur.

Moreover, Ohashi teaches that the same transmitter and receiver receive the same data. In stark contrast, the Applicants' invention teaches that the predefined schedule of scheduled packet bursts are received by different antennas (i.e. via first antenna and via a second antenna).

Khayrallah fails to bridge the substantial gap left by Ohashi because Khayrallah also fails to teach or suggest novel concept of enabling a first antenna to receive a first packet burst in accordance with said predefined schedule and enabling a second antenna to receive a second packet burst in accordance with the predefined schedule, wherein the first packet burst and the second packet burst comprise identical packets of a common message. Khayrallah only teaches that the antennas are selected according to conventional selection diversity methods such as, to maximize signal strength or signal-to-noise ratio. (See Khayrallah, para. 2, II.10-11). Therefore, the combination of Ohashi and Khayrallah does not teach or suggest Applicants' invention as recited in independent claim 5.

Therefore, Applicants respectfully submit that independent claim 5 is clearly patentable and not made obvious by Ohashi and Khayrallah. Furthermore, dependent claim 6 depends from claim 5 and recites additional limitations. As such, and for the

exact same reason set forth above, the Applicants submit that claim 6 is also not made obvious by the teachings of Ohashi and Khayrallah.

D. Claim 7

The Applicants note that claim 7 is not addressed in a specific heading in the Final Office Action. However, based on the Examiner's comments on page 12, it appears that the Examiner rejected claim 7 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Ohashi in view of Khayrallah, and further in view of Suzuki. Under such assumption, Applicants respectfully traverse the rejection.

The teachings of Ohashi, Khayrallah and Suzuki have been discussed above. However, the combination of Ohashi, Khayrallah and Suzuki fails to teach, show or suggest the Applicants' invention. Specifically, the Ohashi, Khayrallah and Suzuki fail to disclose the novel concept of enabling a first antenna to receive a first packet burst in accordance with said predefined schedule and enabling a second antenna to receive a second packet burst in accordance with the predefined schedule, wherein the first packet burst and the second packet burst comprise identical packets of a common message. Therefore, the combination of Ohashi, Khayrallah and Suzuki does not teach or suggest Applicants' invention as recited in independent claim 5.

Dependent claim 7 depends from claim 5 and recites additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claim 7 is also not made obvious by the teachings of Ohashi, Khayrallah and Suzuki.

E. Claim 10

The Examiner has rejected claim 10 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Suzuki and Ohashi in view of Struhsaker et al. (U.S. Patent Publication No. 2002/0141355, published October 3, 2002, hereinafter referred to as "Struhsaker"). Applicants respectfully traverse the rejection.

The teachings of Suzuki and Ohashi are discussed above. Struhsaker teaches a wireless access system and associated method using multiple modulation formats in TDD frames according to subscriber service type. Further, Struhsaker teaches that information can be sent in packet data units (PDU). Each PDU can be broken into

segments that are protected by FEC CRC fields, thus avoiding wasting bandwidth.
(See Struhsaker, p. 12, para. 159.)

However, Struhsaker fails to bridge the substantial gap left by Suzuki and Ohashi. Specifically, Struhsaker also fails to disclose the novel concept of transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message and receiving each of the packet bursts individually at one of a plurality of antennas in accordance with a predefined schedule.

As stated above, the combination of Suzuki and Ohashi simply does not teach or suggest the novel concept of transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message and receiving each of the packet bursts individually at one of a plurality of antennas in accordance with a predefined schedule. This deficiency is not bridged by the teaching of Struhsaker because Struhsaker only teaches that packet data unit may be a complete packet transmission or a fragment of a much larger message. (See Struhsaker, p. 12, para. 159.) Therefore, the combination of Suzuki, Ohashi and Struhsaker does not teach or suggest Applicants' invention as recited in independent claim 8.

Dependent claim 10 depends from claim 8 and recites additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claim 10 is also not made obvious by the teachings of Suzuki, Ohashi and Struhsaker.

F. Claims 19 and 20

The Examiner has rejected claims 19 and 20 in the Office Action under 35 U.S.C. § 103 as being unpatentable over Suzuki and Ohashi in view of Sampath et al. (U.S. Patent Publication No. 2003/0012308, published January 16, 2003, hereinafter referred to as "Sampath"). Applicants respectfully traverse the rejection.

The teachings of Suzuki and Ohashi are discussed above. Sampath teaches a method of adaptive channel estimation for wireless systems. Further, Sampath teaches

that signals can be sent with training symbols embedded in data symbols. (See Sampath, Abstract).

However, Sampath fails to bridge the substantial gap left by Suzuki and Ohashi. Specifically, Sampath also fails to disclose the novel concept of transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message and receiving each of the packet bursts individually at one of a plurality of antennas in accordance with a predefined schedule.

As stated above, the combination of Suzuki and Ohashi simply does not teach or suggest the novel concept transmitting a message contained within a plurality of packet bursts occurring at spaced time intervals, wherein a first packet burst and a second packet burst of said plurality of packet bursts comprise identical packets of a common message and receiving each of the packet bursts individually at one of a plurality of antennas in accordance with a predefined schedule. This deficiency is not bridged by the teaching of Sampath because Sampath only teaches a method of adaptive channel estimation for wireless systems that include the ability to embed training symbols in data symbols. (See Sampath, Abstract). Therefore, the combination of Suzuki, Ohashi and Sampath does not teach or suggest Applicants' invention as recited in independent claim 8.

Dependent claims 19 and 20 depend from claim 8 and recite additional limitations. As such, and for the exact same reason set forth above, the Applicants submit that claims 19 and 20 are also not made obvious by the teachings of Suzuki, Ohashi and Sampath.

Conclusion

Thus, the Applicants submit that all of these claims now fully satisfy the requirements of 35 U.S.C. §103. Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the maintenance of the present final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 842-8110 x130 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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